State: GUJARAT

Agriculture Contingency Plan for District: KUTCH

1.0 District Agriculture profile					
1.1	**Agro-Climatic/Ecological Zone**				
	Agro Ecological Sub Region (ICAR)	Western Plain, Kachchh And Part Of Kathia (2.2, 2.4)			
	Agro-Climatic Zone (Planning Commission)	Gujarat Plains and Hills Region (XIII)			
	Agro Climatic Zone (NARP)	North West Zone (GJ-5)			
	List all the districts or part thereof falling under the NARP Zone	Kachchh, Rajkot, Surendranagar, Mehsana, Banaskantha and Ahmedabad			
	Geographic coordinates of district headquarters	Latitude	Longitude	Altitude	
		23º24'23.46" N	69º38'31.58" E	109 M	
	Name and address of the concerned ZRS/ ZARS/ RARS/ RRS/ RRTTS	Agricultural Research Station, S.D.Agricultural University, Bhachau-Kachchh Agricultural Research Complex, S.D.Agricultural University, Kothara-Kachchh Centre for Resource Conservation Technology, Rapar- S.D.Agricultural University, Kachchh Date Palm Research Station, S.D.Agricultural University, Mundra, Kachchh			
	Mention the KVK located in the district	Krishi Vigyan Kendra, Vivekanand Research and Training Institute, Mundra, Kachchh			
1.2	**Rainfall**	Normal RF(mm)	Normal Rainy days (number)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
	SW monsoon (June-Sep):	353	15	Last week of June	Last week of September
	NE Monsoon(Oct-Dec):	-	-		
	Winter (Jan- March)	-	-		
	Summer (Apr-May)	-	-		
	Annual	353	15		

1.3	**Land use pattern of the district** (latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
	Area ('000 ha)	1958	680	307	74	70	339	0	412	76	0

Source: District Panchayat, Bachchh, Bhuj

1. 4	**Major Soils (common names like red sandy loam deep soils (etc.,)***	**Area ('000 ha)**	**% of total**
	Black soils	1054	53.8
	Sandy Soils	815	41.6
	Hydromorphic Soils	89	4.5

1.5	**Agricultural land use**	Area ('000 ha)	Cropping intensity %
	Net sown area	680.0	107
	Area sown more than once	48.0	
	Gross cropped area	728.0	

1.6	**Irrigation**	Area ('000 ha)		
	Net irrigated area	178.0		
	Gross irrigated area	341.2		
	Rainfed area	502.0		
	Sources of Irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
	Canals		132.1	38.7
	Tanks	2608	-	-
	Open wells	28664	194.3	56.9
	Bore wells	219	14.8	4.4
	Lift irrigation schemes	-	-	-
	Micro-irrigation	-	-	-
	Other sources (please specify)	-	-	-
	Total Irrigated Area	-	341.2	-
	Pump sets	33273	-	-
	No. of Tractors	-	-	-
	Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
	Over exploited	4 (Anjar, Mandvi, Bhachau, Rapar)		

	Critical	-		
	Semi- critical	Rest of the blocks		
	Safe			
	Wastewater availability and use			
	Ground water quality			
over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%				

Source: District Panchayat, Bachchh, Bhuj

1.7 Area under major field crops & horticulture (as per latest figures) (Average of 2004-05 to 2007-08)

1.7	**Major field crops cultivated**	**Area ('000 ha)**							
		Kharif			***Rabi***				
		Irrigated	**Rainfed**	**Total**	**Irrigated**	**Rainfed**	**Total**	**Summer**	**Grand total**
	Bajra	-	72.8	72.8	-	-	-	1.8	72.8
	Greengram	-	68.8	68.8	-	-	-	-	68.8
	Castor	-	56.8	56.8	-	-	-	-	56.8
	Groundnut	-	46.5	46.5	-	-	-	12.5	46.5
	Cotton	-	20.6	20.6	-	-	-	-	20.6
	Wheat	-	-	-	19.1	-	19.1	-	19.1
	Mothbean	-	18.3	18.3	-	-	-	-	18.3
	Horticulture crops - Fruits	**Area ('000 ha)**							
		Total							
	Mango	7.8							
	Sapota	1.7							
	Papaya	1.5							
	Banana	1.0							
	Horticulture crops - Vegetables	**Total**							
	Cucurbits	1.9							
	Brinjal	1.6							
	Tomato	0.9							
	Okra	0.6							

Source: District Panchayat, Bachchh, Bhuj

	Medicinal and Aromatic crops	**Total**
	Cumin	8.5
	Isabgol	8.5
	Corriander	5.2
	Dilseed	0.5
	Fenugreek	0.2
	Plantation crops	**Total**
	Datepalm	16.6
	Coconut	0.9
	Eg., industrial pulpwood crops etc.	-
	Fodder crops	**Total**
	Total fodder crop area	31
	Grazing land	70
	Sericulture etc	**-**
	Others (specify)	**-**

Source: District Panchayat, Bachchh, Bhuj

1.8	**Livestock** **Source: 26th survey Report (08-09), Dept. of A. H., Gujarat State**	**Male ('000)**	**Female ('000)**	**Total ('000)**
	Non descriptive Cattle (local low yielding)			380.6
	Crossbred cattle			8.0
	Non descriptive Buffaloes (local low yielding)			
	Graded Buffaloes			226.0
	Goat			484.9
	Sheep			575.0
	Others (Camel, Pig, Yak etc.)			8.5(camel) +1.0(pigs)=9.5
	Commercial dairy farms (Number)			
1.9	**Poultry**	**No. of farms**	**Total No. of birds (No's)**	

	Commercial					9425(layer) + 1075(broilers) + 54(ducks) = 10554		
	Backyard					12531		
1.10	**Fisheries** (Data source: Gujarat Fisheries Statistics 2006-07 and March-10, Commissioner of Fisheries, Govt. of Guarat							
	A. Capture							
	i) Marine (Data Source: Fisheries Department)	**No. of fishermen**	**Boats**		**Nets**		**Storage facilities (Ice plants etc.)**	
			Mechanized	Non-mechanized	Mechanized (Trawl nets, Gill nets)	Non-mechanized (Shore Seines, Stake & trap nets)		
	ii) Inland (Data Source: Fisheries Department)	**No. Farmer owned ponds**		**No. of Reservoirs**		**No. of village tanks**		
	B. Culture							
		Water Spread Area (ha)			**Yield (t/ha)**	**Production (MT)**		
	i) **Brackish water** (Data Source: MPEDA/ Fisheries Department)							
	ii) **Fresh water** (Data Source: Fisheries Department)					**60**		
	Others							

Data source: Gujarat Fisheries Statistics 2006-07 and March-10, Commissioner of Fisheries, Govt. of Gujarat

1.11 Production and Productivity of major crops (Average of last 5 years: 2004, 05, 06, 07, 08, 09; specify years)

1.11	Name of crop	**Kharif**		**Rabi**		**Summer**		**Total**		**Crop residue as fodder** (‘000 tons)
		Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	Production ('000 t)	Productivity (kg/ha)	
Major Field crops (Crops to be identified based on total acreage)										
	Bajra	72.9	986	-	-	4.3	2299	77.2	1023	182
	Greengram	31.0	448	-	-	-	-	31.0	448	61

	Castor	100.1	1741	-	-	-	-	100.1	1741	150
	Groundnut	62.7	1322	-	-	24.7	1963	87.4	14.63	156
	Cotton	24.1(lint)	199	-	-	-	-	24.1(lint)	199	72
	Wheat	-	-	51.1	2646	-	-	51.1	2646	59
	Mothbean	6.7	378	-	-	-	-	6.7	378	13
Major Horticultural crops (Crops to be identified based on total acreage)										
	Mango	-	-	-	-	-	-	56.29	7210	-
	Sapota	-	-	-	-	-	-	21.08	12180	-
	Papaya	-	-	-	-	-	-	167.72	107930	-
	Banana	-	-	-	-	-	-	52.16	52960	-
	Cucurbits	-	-	-	-	-	-	16.30	8470	-
		-	-	-	-	-	-	-	-	-

1.12	**Sowing window for 5 major field crops** (start and end of normal sowing period)	Bajra	Greengram	Castor	Groundnut	Cotton	Wheat	Mothbean
	Kharif- Rainfed	4th week of June - 2nd week of July	4th week of June- 2nd week of July	4th week of June- end of August	4th week of June- 2nd week of July.	4th week of June- 2nd week of July		4th week of June- 2nd week of July
	Kharif-Irrigated	-	-	-	-	-	-	-
	Rabi- Rainfed	-	-	-	-	-	-	-
	Rabi-Irrigated	-	-	-	-	-	3rd to 4th week of November	-

1.13	**What is the major contingency the district is prone to?** (Tick mark)	**Regular**	**Occasional**	**None**
	Drought		✓	
	Flood			✓
	Cyclone			✓
	Hail storm			✓
	Heat wave		✓	
	Cold wave			✓
	Frost			✓
	Sea water intrusion			✓
	Pests and disease outbreak (specify)		✓	
	Others (specify)	-	-	-

1.14	**Include Digital maps of the district for**	Location map of district within State as Annexure I	Enclosed: Yes
		Mean annual rainfall as Annexure 2	Enclosed: Yes
		Soil map as Annexure 3	Enclosed: No

2.0 Strategies for weather related contingencies

2.1 Drought

2.1.1 Rainfed situation

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 2 weeks. i.e. July 2nd week	Low rainfall Black Soils (Abdasa, Mandvi, Nakhatrana, Bhuj)	Cotton-Wheat/ Groundnut-Wheat/ Cotton	No change	No change	
		Bajra	Grow short duration early maturing varieties of Bajra viz.GHB-538, GHB-577	• 20 % higher seed rate • Seed priming with thiourea (0.05%) for four hours • Sowing by adopting compartmental bunding (3.0 X 4.5 m)	• Breeder seed source SAU • Certified seed source NSC,GSSC, GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Castor	No change	• Ridge & furrow method of sowing (90 cm) Or • Compartmental bunding (3.6 X 6.0 m)	• Ridge & furrow maker can be provided under RKVY or other Govt. Agency. • Breeder seed source SAU • Certified seed source NSC,GSSC, GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Groundnut	No change	No change	• Breeder seed source SAU • Certified seed source NSC,GSSC, GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Green gram	No change	No change	-do-
		Mothbean	No change	No change	-do-
		Fodder crop	Jowar**:**	No change	Seed source NSC, GUJCOMASOL, GSSC.

		Jowar	S-1049, SSG-59-3 (Multicut) Bajra: GF Bajra-1 (Multicut)		
		Maize local	African tall	No change	-do-
	Low Rainfall Sandy Soils (Rapar, Bhachau, Anjar, Lakhpat, Gandhidham)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	Grow short duration early maturing varieties of Bajra viz.GHB-538, GHB-577	• 20 %higher seed rate • Seed priming with thiourea (0.05%) for four hours • Sowing by adopting compartmental bunding (3.0 X 4.5 m)	• Breeder seed source SAU • Certified seed source NSC,GSSC, GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Castor	No change	• Ridge & furrow method of sowing (90 cm) Or • Compartmental bunding (3.6 X 6.0 m)	• Ridge & furrow maker can be provided under RKVY or other Govt. Agency. • Breeder seed source SAU • Certified seed source NSC,GSSC, GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Mothbean	No change	No change	-do-
		Green gram	No change	No change	-do-
		Groundnut	No change	No change	-do-
		Cotton	No change	No change	-
		Sesame	No change	No change	-do-
		Fodder crop Jowar	Jowar: S-1049, SSG-59-3 (Multicut) Bajra: GF Bajra-1 (Multicut)	No change	Seed source NSC, GUJCOMASOL, GSSC.
		Maize local:	African tall	No change	-do-

	Low rainfall, Hydromorphic Soils (Mundra)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	Grow short duration early maturing varieties of Bajra viz.GHB-538, GHB-577	• 20 %higher seed rate • Seed priming with thiourea (0.05%) for four hours • Sowing by adopting compartmental bunding (3.0 X 4.5 m)	• Breeder seed source SAU • Certified seed source NSC,GSSC, GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Greengram	No change	No change	-do-
		Castor	No change	• Ridge & furrow method of sowing (90 cm) Or • Compartmental bunding (3.6 X 6.0 m)	• Ridge & furrow maker can be provided under RKVY or other Govt. Agency. • Breeder seed source SAU • Certified seed source NSC,GSSC, GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Cotton	No change	No change	-
		Groundnut	No change	No change	• Breeder seed source SAU • Certified seed source NSC,GSSC, GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Fodder crop Jowar	Jowar: S-1049, SSG-59-3 (Multicut) Bajra: GF Bajra-1 (Multicut)	No change	Seed source NSC, GUJCOMASOL, GSSC.
		Maize local	African tall	No change	-do-

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system[c] including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 4 weeks July 4th Week	Low rainfall Black Soils (Abdasa, Mandvi, Nakhatrana, Bhuj)	Cotton-Wheat/ Groundnut-Wheat/ Cotton	Early maturing Bt-Cotton + Greengram or Blackgram (1:1 Row ratio)	Conservation furrow at every third row	Furrow maker can be provided under RKVY or other Govt. Agency.
		Bajra	• Short duration early maturing Var. GHB-538 and 577 • Karingdo as a mixed crop along with pearl millet third row • Reduce 25% acreage of pear millet by Guar and Mothbean	• Sowing at 60 cm-seed priming with thiourea (0.05%) for four hours • Sowing by adopting compartmental bunding (3.0 X 4.5 m)	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Castor	No Change	• Ridge & furrow method of sowing (90 cm) Or • Compartmental bunding (3.6 X 6.0 m)	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.
		Groundnut \	• Cowpea -Guj.Cowpea-1,2,4 &5 Only as a vegetable purpose, green pod marketing • Clusterbean-HG-75,Guj Guar-1 and 2 • Mothbean-Gujarat Mothbean-1, GMO-2 • Greengram-	• Sowing at 60 cm spacing • Fertilizer reduction by 30 %	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)

			Gujarat Moong-4 • Blackgram- Gujarat Urad-1		
		Greengram	Gujarat Mung-4	• Sowing at 60 cm spacing • Fertilizer reduction by 30 %	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Mothbean	Gujarat Mothbean-1, GMO-2	-do-	-do-
		Fodder crop Jowar	<u>Jowar:</u> S-1049, SSG-59-3 (Multicut) <u>Bajra</u>**:** GF Bajra-1 (Multicut)	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	• Seed source NSC, GUJCOMASOL, GSSC. • Gypsum may supplied by GSFC under subsidies rate
		Maize local	African tall	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	Bund maker can be provided under RKVY
	Low Rainfall Sandy Soils (Rapar, Bhachau, Anjar, Lakhpat, Gandhidham)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	• Short duration early maturing Var. GHB-538 and 577 • Karingdo as a intercrop after every third row of pearl millet • Replace 25% acreage of pearl millet by Guar and Mothbean	• Sowing at 60 cm-seed priming with thiourea (0.05%) for four hours • Sowing by adopting compartmental bunding (3.0 X 4.5 m)	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Castor	No Change	• Ridge & furrow	• Breeder seed source SAU

				method of sowing (90 cm) Or • Compartmental bunding (3.6 X 6.0 m)	• Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.
		Mothbean	Gujarat Mothbean-1, GMO-2	• Sowing at 60 cm spacing • Fertilizer reduction by 30 %	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Greengram	Gujarat Mung-4	-do-	-do-
		Groundnut	• Cowpea -Guj.Cowpea-1,2,4 &5 Only as a vegetable purpose, green pod marketing • Clusterbean-HG-75,Guj Guar-1 and 2 only • Mothbean-Gujarat Mothbean-1, GMO-2 • Greengram-Gujarat Moong-4 • Blackgram-Gujarat Urad-1	• Sowing at 60 cm spacing • Fertilizer reduction by 30 %	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Cotton	Early maturing Bt-Cotton + Greengram or Black gram (1:1 Row ratio)	Conservation furrow at every third row	Furrow maker can be provided under RKVY or other Govt. Agency.

		Sesame	Early maturing var. of sesamum Guj.Til -1 & 2	• 60 cm Row to Row spacing • Thin the plant at 20 cm spacing • Fertilizer reduction by 30 %	• Breeder seed source SAU • Certified seed source NSC,GSSC, GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Fodder crop Jowar	Jowar: S-1049, SSG-59-3 (Multicut) Bajra**:** GF Bajra-1 (Multicut)	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	• Seed source NSC, GUJCOMASOL, GSSC. • Gypsum may supplied by GSFC under subsidized rate
		Maize local	African tall	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	Bund maker can be provided under RKVY
	Low rainfall, Hydromorphic Soils (Mundra)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	• Short duration early maturing Var. GHB-538 and 577 • Karingdo as a inter crop after every third row of pearl millet • Replace 25% acreage of pearl millet by Guar and Mothbean	• Sowing at 60 cm-seed priming with thiurea (0.05%) for four hours • Sowing by adopting compartmental bunding (3.0 X 4.5 m)	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Greengram	Gujarat Mung-4	• Sowing at 60 cm spacing • Fertilizer reduction by 30 %	-do-
		Castor	No Change	• Ridge & furrow method of sowing (90 cm) Or	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing

				• Compartmental bunding (3.6 X 6.0 m)	Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.
		Cotton	Early maturing Bt-Cotton + Greengram or Blackgram (1:1 Row ratio)	Conservation furrow at every third row	Furrow maker can be provided under RKVY or other Govt. Agency.
		Groundnut	• Cowpea -Guj.Cowpea-1,2,4 &5 Only as a vegetable purpose, green pod marketing • Clusterbean- HG-75,Guj Guar-1 and 2 only • Mothbean- Gujarat Mothbean-1, GMO-2 • Greengram- Gujarat Moong-4 • Blackgram- Gujarat Urad-1	• Sowing at 60 cm spacing • Fertilizer reduction by 30 %	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Fodder crop Jowar	<u>Jowar:</u> S-1049, SSG-59-3 (Multicut) <u>Bajra</u>**:** GF Bajra-1 (Multicut)	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	• Seed source NSC, GUJCOMASOL, GSSC. • Gypsum may supplied by GSFC under subsidies rate
		Maize local	African tall	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	Bund maker can be provided under RKVY

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 6 weeks August 2nd week	Low rainfall Black Soils (Abdasa, Mandvi, Nakhatrana, Bhuj)	Cotton-Wheat/ Groundnut-Wheat/ Cotton	• Castor (GCH-4,5 or 7) • Castor (GCH-4,5 or 7) + Clusterbean (Guj Guar 1 or 2) • One row of Cowpea or Clusterbean between regular two rows of castor without giving any fertilizer	• Seed hardening (soaking the seed 8 hours in water followed by shade drying) • Sow the castor crop at 120 cm spacing • Compartmental bunding (3.6 X 6.0 m)	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.
		Bajra	Clusterbean HG-75, Gujarat Guar 1 or 2	• 25% higher seed rate with 60 cm spacing • Reduce the fertilizer by 40 % • Seed hardening (soaking the seed 3 to 4 hours in water followed by shadow drying)	-do-
		Castor	Fodder sorghum GJ-39 and Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.+ • Gypsum provided under subsidies rate by Govt. Agency
		Groundnut	Castor (GCH-4,5 or 7) + Mothbean (GMO-2) (1:2	• Seed hardening (soaking the seed 4 to 6 hours in water	• Breeder seed source SAU • Certified seed source

			row ratio) (two lines of Mothbean in regular spacing of Castor)	followed by shadow drying) • Compartmental bunding (3.6 X 5.0 m) • Reduction in fertilizer application by 50 % • Sowing distance 120 cm for castor • No fertilizer application for inter crop	NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Bund maker provide under RKVY
		Greengram	Clusterbean Hg-75, Gujarat Guar 1 or 2 Fodder Jowar GJ-39, Malvan	• 25% higher seed rate with 60 cm spacing • Reduce the fertilizer by 40 % • Seed hardening (soaking the seed 3 to 4 hours in water followed by shade drying) • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Gypsum provided under subsidies rate by Govt. Agency.
		Mothbean	Fodder sorghum-GJ-39, Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Fodder crop Jowar	Gujarat Mothbean-1 and GMO-2	• Sowing at 60 cm spacing • Fertilizer reduction by 30 %	-do-
		Maize local	Jowar: S-1049, SSG-59-3 (Multicut) Bajra: GF Bajra-1 (Multicut)	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	• Seed source NSC, GUJCOMASOL, GSSC. • Gypsum may supplied by GSFC under subsidies rate
			African tall	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	Bund maker can be provided under RKVY
	Low Rainfall Sandy Soils	Cotton-Wheat/ Groundnut-Wheat/			

	(Rapar, Bhachau, Anjar, Lakhpat, Gandhidham)	Bajra	Clusterbean HG-75, Gujarat Guar 1 or 2	• 25% higher seed rate with 60 cm spacing • Reduce the fertilizer by 40 % • Seed hardening (soaking the seed 3 to 4 hours in water followed by shadow drying)	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.
		Castor	Fodder sorghum GJ-39 and Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.+ • Gypsum provided under subsidies rate by Govt. Agency.
		Mothbean	Castor (GCH-4,5 or 7) + Mothbean (GMO-2) (1:2 row ratio) (two lines of Mothbean in regular spacing of Castor)	• Seed hardening (soaking the seed 4 to 6 hours in water followed by shadow drying) • Compartmental bunding (3.6 X 5.0 m) • Reduction in fertilizer application by 50 % • Sowing distance 120 cm for castor • No fertilizer application for inter crop	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Bund maker provide under RKVY
		Greengram	Gujarat Mothbean-1 and GMO-2	• Sowing at 60 cm spacing • Fertilizer reduction by 30 %	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)

		Groundnut	Fodder sorghum-GJ-39, Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	-do-
		Cotton	Clusterbean Hg-75, Gujarat Guar 1 or 2 Fodder Jowar GJ-39, Malvan	• 25% higher seed rate with 60 cm spacing • Reduce the fertilizer by 40 % • Seed hardening (soaking the seed 3 to 4 hours in water followed by shadow drying) • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Gypsum provided under subsidies rate by Govt. Agency.
		Sesame	• Castor (GCH-4,5 or 7) • Castor (GCH-4,5 or 7) + Clusterbean (Guj Guar 1 or 2) • One row of Cowpea or Clusterbean between regular two row of castor without giving any fertilizer	• Seed hardening (soaking the seed 8 hours in water followed by shadow drying) • Sow the castor crop at 120 cm spacing • Compartmental bunding (3.6 X 6.0 m)	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.
		Fodder crop Jowar	Fodder sorghum-GJ-39, Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Gypsum provided under subsidized rate by Govt. Agency.
		Maize local	Jowar: S-1049, SSG-59-3 (Multicut) Bajra: GF Bajra-1 (Multicut)	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	• Seed source NSC, GUJCOMASOL, GSSC. • Gypsum may supplied by GSFC under subsidized rate

			African tall	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	Bund maker can be provided under RKVY
	Low rainfall, Hydromorphic Soils (Mundra)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	Clusterbean HG-75, Gujarat Guar 1 or 2	• 25% higher seed rate with 60 cm spacing • Reduce the fertilizer by 40 % • Seed hardening (soaking the seed 3 to 4 hours in water followed by shade drying)	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.
		Greengram	Fodder sorghum GJ-39 and Malvan	• Wider spacing at 60 cm with 25 % higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.+ • Gypsum provided under subsidies rate by Govt. Agency.
		Castor	Fodder sorghum-GJ-39, Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-)
		Cotton	Castor (GCH-4,5 or 7) + Mothbean (GMO-2) (1:2 row ratio) (two lines of Mothbean in regular	• Seed hardening (soaking the seed 4 to 6 hours in water followed by shade drying) • Compartmental bunding (3.6	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs.

			spacing of Castor)	X 5.0 m) • Reduction in fertilizer application by 50 % • Sowing distance 120 cm for castor • No fertilizer application for inter crop	30000/-) • Bund maker provide under RKVY
		Groundnut	• Castor (GCH-4,5 or 7) • Castor (GCH-4,5 or 7) + Clusterbean (Guj Guar 1 or 2) • One row of Cowpea or Clusterbean between regular two rows of Castor without giving any fertilizer	• Seed hardening (soaking the seed 8 hours in water followed by shade drying) • Sow the Castor crop at 120 cm spacing • Compartmental bunding (3.6 X 6.0 m)	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency.
		Fodder crop Jowar	Clusterbean Hg-75, Gujarat Guar 1 or 2 Fodder Jowar GJ-39, Malvan	• 25% higher seed rate with 60 cm spacing • Reduce the fertilizer by 40 % • Seed hardening (soaking the seed 3 to 4 hours in water followed by shade drying) • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Gypsum provided under subsidies rate by Govt. Agency.
		Maize local	Jowar: S-1049, SSG-59-3 (Multicut) Bajra: GF Bajra-1 (Multicut)	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	• Seed source NSC, GUJCOMASOL, GSSC. • Gypsum may supplied by GSFC under subsidies rate
			African tall	-do-	Bund maker can be provided under RKVY

Condition			Suggested Contingency measures		
Early season drought (delayed onset)	**Major Farming situation**	**Normal Crop / Cropping system**	**Change in crop / cropping system including variety**	**Agronomic measures**	**Remarks on Implementation**
Delay by 8 weeks August 4th week	Low rainfall Black Soils (Abdasa, Mandvi, Nakhatrana, Bhuj)	Cotton-Wheat/ Groundnut-Wheat/ Cotton	Clusterbean Hg-75, Gujarat Guar 1 or 2 Fodder Jowar GJ-39, Malvan	• 25% higher seed rate with 60 cm spacing • Reduce the fertilizer by 40 % • Seed hardening (soaking the seed 3 to 4 hours in water followed by shade drying) • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency. • Gypsum provided under subsidies rate by Govt. Agency.
		Bajra	Fodder Jowar GJ-39, Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	-do-
		Castor	• Castor (GCH-4,5 or 7) + Cowpea (GC-4 (one line of Cowpea in regular spacing of Castor) Or • Castor (GCH-4,5 or 7) + Purva Til (purva-1) (1:1 Row ratio)	• Seed hardening (soaking the seed 4 to 6 hours in water followed by shade drying) • Reduction in fertilizer application by 50 % • Sowing distance 120 cm for Castor • No fertilizer application for inter crop	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Bund maker provide under RKVY • Seed drill can be provided under RKVY or any other Govt. Agency on subsidies rate
		Groundnut	Sesame Purva (semi rabi var.)	No change	• Breeder seed source SAU • Certified seed source

			Purva-1		NSC,GSSC,GUJCOMASOL
		Greengram	Fodder Jowar GJ-39, Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Gypsum provided under subsidies rate by Govt. Agency.
		Mothbean	Fodder Jowar GJ-39, Malvan	-do-	-do-
		Fodder crop Jowar	Jowar:S-1049, SSG-59-3 (Multicut) Bajra:GF Bajra-1 (Multicut) Reduce the seed rate by 25 %	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	• Seed source NSC, GUJCOMASOL, GSSC. • Gypsum may supplied by GSFC under subsidized rate • Bund maker can be provided under RKVY
		Maize local	-do-	-do-	• Bund maker can be provided under RKVY • Gypsum may supplied by GSFC under subsidized rate
	Low Rainfall Sandy Soils (Rapar, Bhachau, Anjar, Lakhpat, Gandhidham)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	Fodder Jowar GJ-39, Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency. • Gypsum provided under subsidised rate by Govt. Agency.
		Castor	• Castor (GCH-4,5 or 7) + Cowpea (GC-4	• Seed hardening (soaking the seed 4 to 6 hours in	• Breeder seed source SAU • Certified seed source

			(one line of Cowpea in regular spacing of castor) Or • Castor (GCH-4,5 or 7) + Purva Til (purva-1) (1:1 Row ratio)	water followed by shadow drying) • Reduction in fertilizer application by 50 % • Sowing distance 120 cm for castor • No fertilizer application for inter crop	NSC,GSSC,GUJCOMASOL • Bund maker provide under RKVY • Seed drill can be provided under RKVY or any other Govt. Agency on subsidised rate
		Mothbean	Fodder Jowar GJ-39, Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Gypsum provided under subsidised rate by Govt. Agency.
		Greengram	Fodder Jowar GJ-39, Malvan	-do-	-do-
		Groundnut	Sesame Purva (semi rabi var.) Purva-1	No change	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL
		Cotton	Clusterbean Hg-75, Gujarat Guar 1 or 2 Fodder Jowar GJ-39, Malvan	• 25% higher seed rate with 60 cm spacing • Reduce the fertilizer by 40 % • Seed hardening (soaking the seed 3 to 4 hours in water followed by shade drying) • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency. • Gypsum provided under subsidies rate by Govt. Agency.
		Sesame	Purva (semi rabi var.) Purva-1	No change	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL
		Fodder crop Jowar	Jowar:S-1049, SSG-59-3 (Multicut) Bajra:GF Bajra-1	• Compartmental Bunding (3.6 m x 6.0 m)	• Seed source NSC, GUJCOMASOL, GSSC.

			(Multicut) Reduce the 25 % seed rate	• S applicaton @ 20 kg/ha in form of Gypsum	• Gypsum may supplied by GSFC under subsidies rate • Bund maker can be provided under RKVY
		Maize local	-do-	-do-	• Bund maker can be provided under RKVY • Gypsum may supplied by GSFC under subsidies rate
	Low rainfall, Hydromorphic Soils (Mundra)	Cotton-Wheat/ Groundnut-Wheat/			
		Bajra	Fodder Jowar GJ-39, Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency. • Gypsum provided under subsidies rate by Govt. Agency.
		Greengram	Fodder Jowar GJ-39, Malvan	• Wider spacing at 60 cm with 25 %higher seed rate • Reduce the fertilizer application by 40 % • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Gypsum provided under subsidies rate by Govt. Agency.
		Castor	• Castor (GCH-4,5 or 7) + Cowpea (GC-4 (one line of Cowpea in regular spacing of Castor) Or • Castor (GCH-4,5 or 7) + Purva Til (purva-1)	• Seed hardening (soaking the seed 4 to 6 hours in water followed by shadow drying) • Reduction in fertilizer application by 50 % • Sowing distance 120 cm for castor • No fertilizer application	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Bund maker provide under RKVY • Seed drill can be provided under RKVY or any other Govt. Agency on subsidies rate

			(1:1 Row ratio)	for inter crop	
		Cotton	Clusterbean Hg-75, Gujarat Guar 1 or 2 Fodder Jowar GJ-39, Malvan	• 25% higher seed rate with 60 cm spacing • Reduce the fertilizer by 40 % • Seed hardening (soaking the seed 3 to 4 hours in water followed by shadow drying) • In fodder Sorghum, apply 20 kg S/ha through Gypsum	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL • Seed drill under RKVY (costing Rs. 30000/-) • Ridge & furrow maker can be provided under RKVY or other Govt. Agency. • Gypsum provided under subsidies rate by Govt. Agency.
		Groundnut	Sesame Purva (semi rabi var.) Purva-1	No change	• Breeder seed source SAU • Certified seed source NSC,GSSC,GUJCOMASOL
		Fodder crop Jowar	Jowar:S-1049, SSG-59-3 (Multicut) Bajra:GF Bajra-1 (Multicut) Reduce the seed rate by 25 %	• Compartmental Bunding (3.6 m x 6.0 m) • S applicaton @ 20 kg/ha in form of Gypsum	• Seed source NSC, GUJCOMASOL, GSSC. • Gypsum may supplied by GSFC under subsidies rate • Bund maker can be provided under RKVY
		Maize local	-do-	-do-	• Bund maker can be provided under RKVY • Gypsum may supplied by GSFC under subsidies rate

Condition			Suggested Contingency measures		
Early season drought **(Normal onset)**	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
Normal onset followed by 15-20 days dry spell after sowing leading to poor germination/crop stand etc.	Low rainfall Black Soils (Abdasa, Mandvi, Nakhatrana, Bhuj)	Cotton-Wheat/ Groundnut-Wheat/ Cotton	Gap filling and thinning to retain one plant / hill	Conservation of soil moisture by hoeing and weeding. Use weeds as mulch	Implements for hoeing & weeding be procured under RKVY or Govt. subsidies rate
		Bajra	Thinning to maintain 10 to 15 cm plant to plant distance	-do -	-do-
		Castor	Gap filling and Thinning to retain one plant/hill	-do-	-do-
		Groundnut	Gap filling	-do-	-do-
		Greengram	-	-do-	-do-
		Mothbean	-	-	-
		Fodder crop Jowar	No change	No change	-
		Maize local	No change	No change	-
	Low Rainfall Sandy Soils (Rapar, Bhachau, Anjar, Lakhpat, Gandhidham)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	Thinning to maintain 10 to 15 cm plant to plant distance	Conservation of soil moisture by hoeing and weeding. Use weeds as mulch	Implements for hoeing & weeding be procured under RKVY or Govt. subsidies rate
		Castor	Gap filling and Thinning to retain one plant/hill	-do-	-do-
		Mothbean	-	-do-	-do-
		Greengram	-	-do-	-do-
		Groundnut	Gap filling	-do-	-do-
		Cotton	Gap filling and thinning to	-do-	-do-

			retain one plant / hill		
		Sesame	Thinning to maintain 15 to 20 cm plant to plant distance	-do-	-do-
		Fodder crop Jowar	No change	No change	-
		Maize local	No change	No change	-
	Low rainfall, Hydromorphic Soils (Mundra)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	Thinning to maintain 10 to 15 cm plant to plant distance	Conservation of soil moisture by hoeing and weeding. Use weeds as mulch	Implements for hoeing & weeding be procured under RKVY or Govt. subsidised rate
		Greengram	-	-do-	-do-
		Castor	Gap filling and Thinning to retain one plant/hill	-do-	-do-
		Cotton	Gap filling and thinning to retain one plant / hill	-do-	-do-
		Groundnut	Gap filling	-do-	-do-
		Fodder crop Jowar	No change	No change	-
		Maize local	No change	No change	-

Condition			Suggested Contingency measures		
Mid season drought (long dry spell, consecutive 2 weeks rainless (>2.5 mm) period)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At vegetative stage	Low rainfall Black Soils (Abdasa, Mandvi, Nakhatrana, Bhuj)	Cotton-Wheat/ Groundnut-Wheat/ Cotton	• Reduce the plant population by 15 to 20 %and use as mulching material • Alternate furrow irrigation or irrigation through MIS if possible	• Conservation of soil moisture by hoeing and weeds use as mulch • Mulching with farm byproduct @ 10t/ha (castor shell or Bajra husk) • Postpone the top dressing of N fertilizers • Mulching with Plastic film of 25 micron @ 200 kg/ha	• Implements for hoeing & weeding be procured under RKVY or Govt. subsides rate • Mulching material under RKVY or Govt. subsidized rate • Water harvesting structure can be constructed under NAREGA
		Bajra	• Thinning of 20 to 25 % plants within row • Life saving irrigation if possible	• Conservation of soil moisture by hoeing and weeding • Postpone the top dressing of N fertilizers • Spraying of 5 % kaoline solution	-do-
		Castor	• Reduce the plant population by 10 to 15 %and use as mulch • Alternate furrow irrigation • If possible life saving irrigation through MIS	• Conservation of soil moisture by hoeing and weeds can be used as mulch • Mulching with farm byproduct @ 10t/ha (Castor shell or Bajra husk) • Postponed the top dressing of N fertilizers • Mulching with Plastic film of 25 micron @ 200 kg/ha + Spraying of 5% kaolin solution	• Implements for hoeing & weeding be procured under RKVY or Govt. subsidies rate • Mulching material under RKVY or Govt. subsidies rate • Water harvested structure can be constructed under NAREGA • MIS can be provided under subsidies rate through GGRC

		Groundnut	• Weeding & hoeing • Protection against sucking pest(Spraying of Methyle o demeton or Diamethoate 10 ml/10 lit of water) • If possible life saving irrigation through MIS	• Aviod top dressing of N fertilizers • Mulching with farm byproduct @ 10t/ha (Castor shell or Bajra husk) • Mulching with Plastic film of 25 micron @200 kg/ha	• Implements for hoeing & weeding be procured under RKVY or Govt. subsides rate • Mulching material can be provided under RKVY • MIS can be provided under subsidies rate through GGRC
		Greengram	• Removal of 20% plants from the row • Protection against sucking pest (Spraying of Methyle o demeton or Diamethoate 10 ml/10 lit of water) • If possible life saving irrigation through MIS	• Intercultivation • Weeding	• Implements for hoeing & weeding be procured under RKVY or Govt. subsidies rate
		Mothbean	-do-	-do-	-do-
		Fodder crop Jowar	Life saving irrigation if possible. • Restrict the fertilizer application if moisture is insufficient • Reduce 25% plant population	• Interculturing • Soil mulch by selo interculturing	-
		Maize local	-do-	-do-	-
	Low Rainfall Sandy Soils (Rapar, Bhachau, Anjar, Lakhpat, Gandhidham)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	• Thinning of 20 to 25 % plants within row • Life saving irrigation if possible • Spraying of 5 % kaoline solution	• Conservation of soil moisture by hoeing and weeding	• Implements for hoeing & weeding be procured under RKVY or Govt. subsides rate • Mulching material under RKVY or Govt. subsides rate

			• Postpone the top dressing of N fertilizers		• Water harvested structure can be constructed under NAREGA
		Castor	• Reduce the plant population by 10 to 15 %and use as mulch • Alternate furrow irrigation • If possible life saving irrigation through MIS • Postponed the top dressing of N fertilizers	• Conservation of soil moisture by hoeing and weeds can be used as mulch • Mulching with farm byproduct @ 10t/ha (castor shell or Bajra husk) • Mulching with Plastic film of 25 micron @ 200 kg/ha)+ Spraying of 5% kaolin solution	• Implements for hoeing & weeding be procured under RKVY or Govt. subsidies rate • Mulching material under RKVY or Govt. subsidies rate • Water harvested structure can be constructed under NAREGA • MIS can be provided under subsidies rate through GGRC
		Mothbean	• Reduce the plant population by 10 to 15 % and use as mulch • Alternate furrow irrigation • weeding • Protection against sucking pest (Spraying of Methyle o demeton or Dimethoate 10 ml/10 lit of water) • If possible life saving irrigation through MIS	-do-	-do-
		Greengram	• Removal of 20% plant from the row • Weeding • Protection against sucking pest (Spraying of Methyle o demeton or Dimethoate 10 ml/10 lit of water) • If possible life saving irrigation through MIS	-do-	-do-
		Groundnut	• Protection against sucking pest(Spraying of Methyle o demeton or Diamethioate 10	• Weeding & hoeing • Mulching with farm byproduct @	• Implements for hoeing & weeding be procured under RKVY or Govt. subsidised

			ml/10 lit of water) • If possible life saving irrigation through MIS • Aviod top dressing of N fertilizers	10t/ha (castor shell or Bajra husk) • Mulching with Plastic film of 25 micron @200 kg/ha	rate • Mulching material can be provided under RKVY • MIS can be provided under subsidies rate through GGRC
		Cotton	• Reduce the plant population by 15 to 20 %and use as mulching material • Alternate furrow irrigation or irrigation through MIS if possible	• Conservation of soil moisture by hoeing and weeds can be used as mulch • Mulching with farm byproduct @ 10t/ha (castor shell or Bajra husk) • Postpone the top dressing of N fertilizers • Mulching with Plastic film of 25 micron @ 200 kg/ha	• Implements for hoeing & weeding be procured under RKVY or Govt. subsides rate • Mulching material under RKVY or Govt. subsides rate • Water harvesting structure can be constructed under NAREGA
		Sesame	• Removal of 20% plant from the row • Weeding • Protection against sucking pest (Spraying of Methyle o demeton or Dimethoate 10 ml/10 lit of water) • If possible life saving irrigation through MIS	• Interculturing	• Implements for hoeing & weeding be procured under RKVY or Govt. subsides rate • MIS can be provided under subsidies rate through GGRC
		Fodder crop Jowar	• Restrict the fertilizer application if moisture is insufficient • Reduce 25% plant population	• Interculturing • Soil mulch by sallow interculturing • Life saving irrigation if possible.	-
		Maize local	-do-	-do-	-
	Low rainfall, Hydromorphic Soils (Mundra)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	• Thinning of 20 to 25 % plants within row • Life saving irrigation if possible	• Conservation of soil moisture by hoeing and weeding • Postpone the top dressing of N fertilizers • Spraying of 5 % kaoline solution	• Implements for hoeing & weeding be procured under RKVY or Govt. subsides rate • Mulching material under

					RKVY or Govt. subsides rate • Water harvested structure can be constructed under NAREGA
		Greengram	• Removal of 20% plant from the row • Weeding • Protection against sucking pest (Spraying of Methyle o demeton or Dimethoate 10 ml/10 lit of water) • If possible life saving irrigation through MIS	• Interculturing	• Implements for hoeing & weeding be procured under RKVY or Govt. subsidies rate
		Castor	• Reduce the plant population by 10 to 15 %and use as mulch • Alternate furrow irrigation • If possible life saving irrigation through MIS	• Conservation of soil moisture by hoeing and weeds use as mulch • Mulching with farm byproduct @ 10t/ha (Castor shell or Bajra) • Postpone the top dressing of N fertilizers • Mulching with Plastic film of 25 micron @ 200 kg/ha + Spraying of 5% kaolin solution	• Implements for hoeing & weeding be procured under RKVY or Govt. subsidies rate • Mulching material under RKVY or Govt. subsidies rate • Water harvested structure can be constructed under NAREGA • MIS can be provided under subsidies rate through GGRC
		Cotton	• Reduce the plant population by 15 to 20 %and use as mulching material • Alternate furrow irrigation or irrigation through MIS if possible	• Conservation of soil moisture by hoeing and weeds use as mulch • Mulching with farm byproduct @ 10t/ha (castor shell or Bajra husk) • Postpone the top dressing of N fertilizers • Mulching with Plastic film of 25 micron @ 200 kg/ha	• Implements for hoeing & weeding be procured under RKVY or Govt. subsides rate • Mulching material under RKVY or Govt. subsides rate • Water harvested structure can be constructed under NAREGA

		Groundnut	• Weeding & hoeing • Protection against sucking pest(Spraying of Methyle o demeton or Diamethioate 10 ml/10 lit of water) • If possible life saving irrigation through MIS	• Aviod top dressing of N fertilizers • Mulching of farm byproduct @ 10t/ha (Castor shell or Bajra husk) • Mulching with Plastic film of 25 micron @200 kg/ha	• Implements for hoeing & weeding be procured under RKVY or Govt. subsides rate • Mulching material can be provided under RKVY • MIS can be provided under subsidies rate through GGRC
		Fodder crop Jowar	• Restrict the fertilizer application if moisture is insufficient • Reduce 25% plant population	• Interculturing • Soil mulch by selo interculturing • Life saving irrigation if possible	-
		Maize local	-do-	-do-	-

Condition			**Suggested Contingency measures**		
Mid season drought (long dry spell)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Soil nutrient & moisture conservation measures**	**Remarks on Implementation**
At flowering/ fruiting stage	Low rainfall Black Soils (Abdasa, Mandvi, Nakhatrana, Bhuj)	Cotton-Wheat/ Groundnut-Wheat/ Cotton	• Reduce the plant population by 15 to 20 %and use as mulching material • Alternate furrow irrigation or irrigation through drip system • Protect the crop against parawilt: • Band application of organic manures and 25% NPK as additional dose • Spraying of 0.5 % $MgSO_4$ solution • Drenching with *Trichoderma Viride* and *Pseudomonas fluorescens* @100	• Avoid top dressing of N fertilizers • Mulching with farm byproduct @ 10t/ha (castor shell or Bajra husk) • Mulching with Plastic film of 25 micron @ 200 kg/ha	Mulching material like plastic film can be provided under RKVY or Cotton Mission

			gm in 10 lit. water		
		Bajra	• Remove the barren tillers and use as fodder • Remove every fourth row and use as dry fodder • Life saving irrigation if possible	• Spraying of 5% kaolin solution	• Labour for harvesting can be provided under MANREGA • Kaolin provided under RKVY or NFSM
		Castor	• Removal of plant population upto 20% and use as mulch • Alternate furrow irrigation or irrigation through MIS if possible • Remove the 2 lower elder leaves and use as mulch	• Avoid top dressing of N fertilizers • Spraying of 5% kaolin solution • Mulching with farm byproduct @ 10t/ha (Castor shell or Bajra husk) • Mulching with Plastic film of 25 micron @ 200 kg/ha	• Kaolin and mulching material provided under RKVY or other Govt. Agency • MIS can be provided under GGRC
		Groundnut	Life saving irrigation	• Mulching with farm byproduct @ 10t/ha (castor shell, Bajra, wheat husk) • Mulching with Plastic film of 25 micron @ 200 kg/ha	• Implements for hoeing & weeding be procured under RKVY or Govt. subsidized rate • Mulching material under RKVY or Govt. subsidized rate
		Greengram	• Removal of 20% to 25 % plant from the row and use as fodder • Life saving irrigation • Protection against sucking pest (Spraying of Methyle o demeton or Dimethoate 10 ml/10 lit of water) • Protection against podborer (spraying of monocrotophos 10 ml, Endosulphan 20 ml or Acephate 20 gm in 10 lit of water at 50% flowering followed by 15 day)	-	• Sprayers and duster be procured under RKVY or pulse production mission

		Mothbean	• Removal of 20% to 25 % plant from the row and use as fodder • Life saving irrigation • Protection against sucking pest (Spraying of Methyle o demeton or Diamethioate 10 ml/10 lit of water) • Protection against podborer (spraying of Monocrotophos 10 ml, Endosulphan 20 ml or Acephate 20 gm in 10 lit of water at 50% flowering followed by 15 day)	---	• Sprayers and duster be procured under RKVY or pulse production mission
		Fodder crop Jowar	Life saving irrigation if possible. Reduce 30 % plant population	Restrict the fertilizer application if moisture is insufficient	-
		Maize local	Life saving irrigation if possible.	Reduce 25% of plant population	-
	Low Rainfall Sandy Soils (Rapar, Bhachau, Anjar, Lakhpat, Gandhidham)	Cotton-Wheat/ Groundnut-Wheat/			
		Bajra	• Remove the barren tillers and use as fodder • Remove the every fourth row and use as dry fodder • Life saving irrigation if possible	Spraying of 5% kaolin solution	• Labour for harvesting can be provided under MANREGA • Kaolin provided under RKVY or NFSM
		Castor	• Removal of plant population from 20% and use as mulch • Alternate furrow irrigation or irrigation through MIS if possible • Remove the 2 lower elder leaves and use as mulch	• Avoid top dressing of N fertilizers • Spraying of 5% kaolin solution • Mulching with farm byproduct @ 10t/ha (castor shell or Bajra husk) • Mulching withPlastic film of 25 micron @ 200 kg/ha	• Kaolin and mulching material provided under RKVY or other Govt. Agency • MIS can be provided under GGRC
		Mothbean	• Removal of 20% to 25 % plant from the row and use as fodder	-	Sprayers and duster be procured under RKVY or

			• Life saving irrigation • Protection against sucking pest (Spraying of Methyle o demeton or Dimethoate 10 ml/10 lit of water) • Protection against podborer (spraying of monocrotophos 10 ml, endosulphan 20 ml or Acephate 20 gm in 10 lit of water at 50% flowering followed by 15 day)		pulse production mission
		Greengram	-do-	-	-do-
		Groundnut	Life saving irrigation	• Mulching with farm byproduct @ 10t/ha (castor shell, Bajra, wheat husk) • Mulching with Plastic film of 25 micron @ 200 kg/ha	• Implements for hoeing & weeding be procured under RKVY or Govt. subsidized rate • Mulching material under RKVY or Govt. subsidized rate
		Cotton	• Reduce the plant population by 15 to 20 %and use as mulching material • Alternate furrow irrigation or irrigation through drip system • Protect the crop against parawilt: • Band application of organic manures and 25% NPK as additional dose • Spraying of 0.5 % $MgSO_4$ solution • Drenching of *Trichoderma Viride* and *Pseudomonas fluorescence* (PGPS) 100 gm in 10 lit. water	• Avoid top dressing of N fertilizers • Mulching with farm byproduct @ 10t/ha (castor shell or Bajra husk) • Mulching with Plastic film of 25 micron @ 200 kg/ha	Mulching material like plastic film can be provided under RKVY or Cotton Mission

		Sesame	• Removal of 20% to 25 % plant from the row and use as fodder • Life saving irrigation • Protection against sucking pest (Spraying of Methyle o demeton or Dimethoate 10 ml/10 lit of water) • Protection against podborer (spraying of monocrotophos 10 ml, endosulphan 20 ml or Acephate 20 gm in 10 lit of water at 50% flowering followed by 15 day)	-	Sprayers and duster be procured under RKVY or pulse production mission
		Fodder crop Jowar	Life saving irrigation if possible.	• Restrict the fertilizer application if moisture is insufficient • Reduce 30 % plant population	-
		Maize local	-do-	Reduce 25% plant population	-
	Low rainfall, Hydromorphic Soils (Mundra)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	• Remove the barren tillers and use as fodder • Remove the every fourth row and use as dry fodder • Life saving irrigation if possible	• Spraying of 5% kaolin solution	• Labour for harvesting can be provided under MANREGA • Kaolin provided under RKVY or NFSM
		Greengram	• Removal of 20% to 25 % plant from the row and use as fodder • Life saving irrigation • Protection against sucking pest (Spraying of Methyle o demeton or Diamethioate 10 ml/10 lit of water) • Protection against podborer (spraying of monocrotophos 10 ml, endosulphan 20 ml or Acefet 20 gm in 10 lit of water at 50% flowering followed by 15 day)	---	• Sprayers and duster be procured under RKVY or pulse production mission

		Castor	• Removal of plant population from 20% and use as mulch • Alternate furrow irrigation or irrigation through MIS if possible • Remove the 2 lower elder leaves and use as mulch	• Avoid top dressing of N fertilizers • Spraying of 5% kaolin solution • Mulching with farm byproduct @ 10t/ha (castor shell or Bajra husk) • Mulching with Plastic film of 25 micron @ 200 kg/ha	• Kaolin and mulching material provided under RKVY or other Govt. Agency • MIS can be provided under GGRC
		Cotton	• Reduce the plant population by 15 to 20 %and use as mulching material • Alternate furrow irrigation or irrigation through drip system • Protect the crop against Parawilt • Band application of organic manures and 25% NPK as additional dose • Spraying of 0.5 % $MgSO_4$ solution • Drenching with *Trichoderma Viride* and *Pseudomonas fluorescense* 100 gm in 10 lit. water	• Avoid top dressing of N fertilizers • Mulching of farm byproduct @ 10t/ha (castor shell or Bajra husk) • Mulching (Plastic film 25 micron @ 200 kg/ha)	• Mulching material like plastic film can be provided under RKVY or Cotton Mission
		Groundnut	Life saving irrigation	• Mulching with farm byproduct @ 10t/ha (castor shell, Bajra, wheat husk) • Mulching with Plastic film of 25 micron @ 200 kg/ha	• Implements for hoeing & weeding be procured under RKVY or Govt. subsidies rate • Mulching material under RKVY or Govt. subsidised rate.
		Fodder crop Jowar	Life saving irrigation if possible.	• Restrict the fertilizer application if moisture is insufficient • Reduce 30 % plant population	---
		Maize local	Life saving irrigation if possible.	• Reduce 25% plant population	---

Condition			Suggested Contingency measures		
Terminal drought (Early withdrawal of monsoon)	**Major Farming situation**	**Normal Crop/cropping system**	**Crop management**	**Rabi Crop planning**	**Remarks on Implementation**
At Maturity stage	Low rainfall Black Soils (Abdasa, Mandvi, Nakhatrana, Bhuj)	Cotton-Wheat/ Groundnut-Wheat/ Cotton	• Pick up lint from brusted ball • Alternate furrow irrigation • Cut down the lower unproductive twigs and kept as mulch	-	---
		Bajra	Harvest the crop at physiological maturity stage		---
		Castor	• Alternate furrow irrigation • Harvest the mature spike • Harvest the spike at physiological maturity stage	---	---
		Groundnut	• Harvest the crop at physiological maturity stage • Life saving irrigation	-	---
		Greengram	• Life saving irrigation • Harvest mature pods	-	---
		Mothbean	• Life saving irrigation • Harvest mature pods	-	---
		Fodder crop Jowar	Harvest the crop and dry it	-	--
		Maize local	-do-	-	--
	Low Rainfall Sandy Soils (Rapar, Bhachau, Anjar, Lakhpat, Gandhidham)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	• Harvest the crop at physiological maturity stage	-	---
		Castor	• Alternate furrow irrigation • Harvest the mature spike • Harvest the spike at physiological	-	

			maturity stage		
		Mothbean	• Life saving irrigation • Harvest mature pods	-	---
		Greengram	-do-	-	---
		Groundnut	• Harvest the crop at physiological maturity stage • Life saving irrigation	-	---
		Cotton	• Pick up lint from bursted ball • Alternate furrow irrigation • Cut down the lower unproductive twings and kept as mulch	-	---
		Sesame	Harvest the crop at physiological maturity stage	-	---
		Fodder crop Jowar	Harvest the crop and drying	-	---
		Maize local	-do -	-	---
	Low rainfall, Hydromorphic Soils (Mundra)	Cotton-Wheat/ Groundnut-Wheat/ Bajra	Harvest the crop at physiological maturity stage	-	---
		Greengram	• Life saving irrigation • Harvest mature pods	-	---
		Castor	• Alternate furrow irrigation • Harvest the mature spike • Harvest the spike at physiological maturity stage	-	---
		Cotton	• Pick up lint from bursted ball • Alternate furrow irrigation • Cut down the lower unproductive twigs and kept as mulch	-	---
		Groundnut	• Harvest the crop at physiological maturity stage • Life saving irrigation	-	---

		Fodder crop Jowar	Harvest the crop and dry it	-	• Breeder seeds from SAUs • Certified seeds from GUJCOMOSOL, GSSC, NSC, NFSM
		Maize local	-do-	-	-do-

2.1.2 Drought - Irrigated situation

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Delayed released of water in canals due to low rainfall	NA				

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Non released of water in canals under delayed onset of monsoon in catchment	NA				

Condition			**Suggested Contingency measures**		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Lack of inflows into tanks due to insufficient /delayed onset of monsoon	**NA**				

Condition			Suggested Contingency measures		
	Major Farming situation	**Normal Crop/cropping system**	**Change in crop/cropping system**	**Agronomic measures**	**Remarks on Implementation**
Insufficient groundwater recharge due to low rainfall	Low rainfall Black SoilS (Abdasa, Mandvi, Nakhatrana, Bhuj)	Wheat	• GW 11 and GW 173 • Reduce area under wheat and replace by Gram: ICC 4,Gram Gujarat 1 & 2, Cumin: Guj 4 Fenugreek: Guj Fenugreek 1 Leafy Vegetables: Palak, Methi Dill Seed: Guj. Dillseed 1 Barley: RD 2052 Isabgol: Guj.Isabgul 1 &2	• Pressurized irrigation at critical stage • Narrow and short water basin in all the crops	• Seed sources Breeder-SAUs Certified: GSSC, GUJCOMASOL, NSC • Pressurized irrigation system through Gujarat Green Revolution Co.Ltd, under subsidized rate.
		Cumin	Dill seed G. Dill seed -3	Raise bed furrow irrigation system	Implement can be provided under RKVY
		Cucurbits	Bottle guard: Pusa navin, Anand-1 Bitter gourd: Arka harit Musk melon: Durgapura Madhu, Durgapura selection	Double row furrow basin planting Alternate furrow irrigation	—
		Okra	Cluster bean Pusa Navabahar	Double row furrow basin planting Alternate furrow irrigation	—

		Brinjal	Gram ICCC-4, Guj-1 & 2 Cumin Guj- 1,2,3 & 4/ Coriander Guj-1 & 2, Fenugreek Guj- 1, Leafy vegetable Radish Japanese white, Pusa hemani, Pusa resham/ Carrot/ cauliflower Snow ball-16, hissar-1, Cabbage Pride of India, Early drum head, Pusa drum head,	Alternate furrow irrigation through drip system	Mulching material can be provided under RKVY
		Tomato	Cluster bean Pusa Navabahar	Trailing system	—
		Cabbage	Cluster bean Pusa Navabahar	Drip irrigation with plastic mulch of 50 micron @ 370 kg/ha	• Drip system can be provided under GGRC • Plastic Mulch can be provided under RKVY
		Cauliflower	• Change in variety • Pusa Kartki, Pusa Agni, Pusa Snow ball	Alternate furrow irrigation	-do-
		Dill seed	Reduce 25% area	Raise bed furrow irrigation system	Implement can be provided under RKVY
		Fennel	Reduce 25% area	Drip irrigation system or Alternate furrow irrigation	• Furrow maker can be provided under RKVY • Drip system can be provided under GGRC
		Date palm	Already Plantation	Drip irrigation system	Drip system can be provided under GGRC
		Coconut	Already Plantation	Drip irrigation system	Drip system can be provided under GGRC
		Lucerne	GALL-1	No change	Seed source from NSSC

		Oat	Bajra (multicut) GF Bajra-1	No change	-do-
	Low rainfall Sandy Soils (Rapar, Bhachau, Anjar, Lakhpat, Gandhidham)	Wheat	• GW 11 and GW 173 • Reduce area under wheat and replace by Gram: ICC 4,Gram Gujarat 1 & 2, Cumin: Guj 4 Fenugreek: Guj Fenugreek 1 Leafy Vegetables: Palak, Methi Dill Seed: Guj. Dillseed 1 Barley: RD 2052 Isabgol: Guj.Isabgul 1 &2	• Pressurized irrigation at critical stage • Narrow and short water basin in all the crops	• Seed sources Breeder-SAUs Certified: GSSC, GUJCOMASOL, NSC • Pressurized irrigation system through Gujarat Green Revolution Co.Ltd, under subsidized rate.
		Cumin	Dill seed: G. Dill seed -3	Raise bed furrow irrigation system	Implement can be provided under RKVY
		Cucurbits	Bottle guard: Pusa navin, Anand-1 Bitter gourd: Arka harit Musk melon: Durgapura Madhu, Durgapura selection	Double row furrow basin planting Alternate furrow irrigation	—
		Okra	Cluster bean Pusa Navabahar	Double row furrow basin planting Alternate furrow irrigation	—

		Brinjal:	Gram ICCC-4, Guj-1 & 2 Cumin Guj- 1,2,3 & 4/ Coriander Guj-1 & 2, Fenugreek Guj- 1, Leafy vegetable Radish Japanese white, Pusa hemani, Pusa resham/ Carrot/ cauliflower Snow ball-16, hissar-1, Cabbage Pride of India, Early drum head, Pusa drum head,	Alternate furrow irrigation through drip system	Mulching material can be provided under RKVY
		Tomato	Cluster bean Pusa Navabahar	Trailing system	—
		Cabbage	Cluster bean Pusa Navabahar	Drip irrigation with plastic mulch of 50 micron @ 370 kg/ha	• Drip system can be provided under GGRC • Plastic Mulch can be provided under RKVY
		Cualiflower	Change in variety Pusa Kartki, Pusa Agni, Pusa Snow ball	Alternate furrow irrigation	-do-
		Dill seed	Reduce upto 25% area	Raise bed furrow irrigation system	Implement can be provided under RKVY
		Fennel	Reduce upto 25% area	Drip irrigation system or Alternate furrow irrigation	• Furrow maker can be provided under RKVY • Drip system can be provided under GGRC
		Date palm	• Already Plantation	• Drip irrigation system	• Drip system can be provided under GGRC

		Coconut	• Already Plantation	• Drip irrigation system	• Drip system can be provided under GGRC
		Lucerne	GALL-1	No change	Seed source from NSSC
		Oat	Bajra (multicut) GF Bajra-1	No change	do
	Low rainfall, Hydromorphic Soils (Mundra)	Wheat	• GW 11 and GW 173 • Reduce area under wheat and replace by Gram: ICC 4,Gram Gujarat 1 & 2, Cumin: Guj 4 Fenugreek: Guj Fenugreek 1 Leafy Vegetables: Palak, Methi Dill Seed: Guj. Dillseed 1 Barley: RD 2052 Isabgol: Guj.Isabgul 1 &2	• Pressurized irrigation at critical stage • Narrow and short water basin in all the crops	• Seed sources Breeder-SAUs Certified: GSSC, GUJCOMASOL, NSC • Pressurized irrigation system through Gujarat Green Revolution Co.Ltd, under subsidized rate.
		Cumin	Dill seed: G. Dill seed -3	Raise bed furrow irrigation system	Implement can be provided under RKVY
		Cucurbits	Bottle guard: Pusa navin, Anand-1 Bitter gourd: Arka harit Musk melon: Durgapura Madhu, Durgapura selection	Double row furrow basin planting Alternate furrow irrigation	—
		Okra	Cluster bean Pusa Navabahar	Double row furrow basin planting Alternate furrow irrigation	—

		Brinjal:	Gram ICCC-4, Guj-1 & 2 Cumin Guj- 1,2,3 & 4/ Coriander Guj-1 & 2, Fenugreek Guj- 1, Leafy vegetable Radish Japanese white, Pusa hemani, Pusa resham/ Carrot/ cauliflower Snow ball-16, hissar-1, Cabbage Pride of India, Early drum head, Pusa drum head,	Alternate furrow irrigation through drip system	Mulching material can be provided under RKVY
		Tomato	Cluster bean Pusa Navabahar	Trailing system	—
		Cabbage	Cluster bean Pusa Navabahar	Drip irrigation with plastic mulch of 50 micron @ 370 kg/ha	• Drip system can be provided under GGRC • Plastic Mulch can be provided under RKVY
		Cualiflower	Change in variety Pusa Kartki, Pusa Agni, Pusa Snow ball	Alternate furrow irrigation	-do-
		Dill seed	Reduce upto 25% area	Raise bed furrow irrigation system	Implement can be provided under RKVY
		Fennel	Reduce upto 25% area	Drip irrigation system or Alternate furrow irrigation	• Furrow maker can be provided under RKVY • Drip system can be provided under GGRC
		Date palm	• Already Plantation	• Drip irrigation system	• Drip system can be provided under GGRC
		Coconut	• Already Plantation	• Drip irrigation system	• Drip system can be provided under GGRC

		Lucerne	GALL-1	No change	Seed source from NSSC
		Oat	Bajra (multicut) GF Bajra-1	No change	do

2.2 Unusual rains (untimely, unseasonal etc) (for both rainfed and irrigated situations)

Condition	Suggested contingency measure			
	Vegetative stage	**Flowering stage**	**Crop maturity stage**	**Post harvest**
Continuous high rainfall in a short span leading to water logging				
Cotton	• Surface drainage • Interculturing for aeration • Apply 25 kg N/ha as additional dose	• Surface drainage • Apply 25 kg N/ha as additional dose • Protect the crop against whitefly and sucking pest(Acephate 75 EC 15 g, Trizophos 40 EC 25 ml, Imidachloprid 2.5 ml in 10 lit of water)	• Surface drainage • Protect the crop against Ball Worm in non Bt cotton • Apply 25 kg N/ha as additional dose	• Cover the produce with plastic sheet(100 micron UV stabilized colour plastic)
Wheat	-	-	Surface drainage to avoid lodging of crop and to control black point in grain, Spray Mancozeb 0.2%	Cover produce with plastic sheet (100 µm, UV stabilized colour plastic) or shift produces to farm shed and protect against pest/disease damage in storage etc,
Groundnut	-	-	Quick surface drainage , Ditch channel around field	-do-
Pulses	-	-	Quick drainage , Harvest mature pods	-do-
Cumin	• Surface drainage • Spray Mancozeb 0.2% to control Cumin blight, 0.2% wettable sulphur for protection against PM	• Surface drainage to avoid water logging & diseases • Spray Mancozeb 0.2% to control Cumin blight, 0.2 % wettable sulphur for protection against PM	Surface drainage	-do-
Bajra	-	-	Harvest mature ear heads	-do-
Horticulture				

Mango	-	Spray 0.2% wettable sulphur or 0.005% Hexaconazole for protection against PM	-	Unripe fruit may be used for pickles.
Papaya	• Provide drainage • Protect the crop from root rot and stem rot(coper oxychloride 0.02% drenching)	• Spray 0.2% wettable sulphur or 0.05% Hexaconazole for protection against powdery mildew • Provide drainage	• Harvest the ripened fruits • Protect the fruits against leafspot and fruit rot(chlorothalonil 0.2% and difenconazole 0.05% spray)	• Transfer the fruits to safer place
Banana	Provide drainage to avoid crop lodging	Provide drainage to avoid crop lodging		
Sapota	-	• Spray 0.2% wettable sulphur or 0.05% Hexaconazole for protection against powdery mildew • Provide drainage	• Harvest the matured fruits • Provide drainage • Protect the fruit against fruit spot (Difenconazole 0.05%spray)	-do-
Heavy rainfall with high speed winds in a short span				
Cotton	• Surface drainage • Interculturing for aeration • Apply 25 kg N/ha as additional dose	• Surface drainage • Apply 25 kg N/ha as additional dose • Protect the crop against whitefly and sucking pest(Acephate 75 EC 15 g, Trizophos 40 EC 25 ml, Imidachloprid 2.5 ml in 10 lit of water)	• Surface drainage (for water logging) • Protect non Bt Cotton against Boll Worm • Apply 25 kg N/ha as additional dose	• Cover the produce with plastic sheet (100 micron UV stabilized colour plastic)
Wheat	Surface drainage	Surface drainage	Surface drainage (for management of water logging, lodging crop and to control black point in grain, Spray Mancozeb 0.2%)	Cover produce with plastic sheet (100 µm , UV stabilized colour plastic) or shift produces to farm shed and protection against pest/disease damage in storage etc,
Groundnut	-	-	Quick surface drainage , Dig channel around field	Cover produce with plastic sheet (100 µm , UV stabilized colour plastic) or shift produces to farm shed and

				protection against pest/disease damage in storage etc,
Pulses	-	-	Quick drainage , Harvest mature pods	-do-
Cumin	• Surface drainage • Spray Mancozeb 0.2% to control Cumin blight, or 0.2% wettable sulphur for protection against PM	• Surface drainage • Mancozeb 0.2% to control Cumin blight)), or 0.2% wettable sulphur for protection against PM	Surface drainage	-do-
Bajra	-	-	Harvest mature ear heads, Quick surface drainage	-do-
Horticulture				
Mango	-	Spray 0.2% wettable sulphur or 0.005% Hexaconazole for protection against PM	Collect fallen fruits	Unripe fruit may be used for pickles.
Papaya	• Provide drainage • Protect the crop from root rot and stem rot (copper oxychloride 0.02% drenching)	• Spray 0.2% wettable sulphur or 0.05% Hexaconazole for protection against powdery mildew • Provide drainage	• Harvest the ripened fruits • Protect the fruits against leafspot and fruit rot(chlorothalonil 0.2% and difenconazole 0.05% spray)	Transfer the fruits to safer place
Banana	-	Earthing up	-	-
Sapota	-	• Spray 0.2% wettable sulphur or 0.05% Hexaconazole for protection against powdery mildew • Provide drainage	• Harvest the matured fruits • Provide drainage • Protect the fruit against fruit spot (Difenconazole 0.05%spray)	-
Outbreak of pests and diseases due to unseasonal rains				
Cotton		Protect the crop against whitefly and sucking pest(Acephate 75 EC 15 g, Trizophos 40 EC 25 ml, Imidachloprid 2.5 ml in 10 lit of water)	Protect the crop against Boll Worm in non Bt Cotton	Cover the produce with plastic sheet(100 micron UV stabilized colour plastic)
Wheat	Spray Mancozeb 0.2% (To control leaf Blight & rust)	Spray Mancozeb 0.2% (To control leaf Blight & rust)	To control black point in grain Spray Mancozeb 0.2%	-

Groundnut	Spray 0.005% Hexaconazole for rust & tikka	Spray 0.005% Hexaconazole for rust & tikka	Spray 0.005% Hexaconazole for rust & tikka	-
Cumin	Spray Mancozeb 0.2% (To control Cumin blight)	Spray Mancozeb 0.2% (To control Cumin Blight)	Spray 0.2% wettable sulphur (To control PM)	-
Bajra	-	-	Spray Mancozeb 0.2% (To control rust)	-
Coriander	Spray 0.005% Hexaconazole or 0.2% wettable sulphur for protection against PM	Spray 0.005% Hexaconazole or 0.2% wettable sulphur for protection against PM	Spray 0.2% wettable sulphur to control PM	-
Horticulture				
Mango	-	Spray 0.2% wettable sulphur or 0.005% Hexaconazole for protection against PM		.
Papaya	Protect the crop from root rot and stem rot(coper oxychloride 0.02% drenching)	Spray 0.2% wettable sulphur or 0.05% Hexaconazole for protection against powdery mildew	Protect the fruits against leafspot and fruit rot(chlorothelonil 0.2% and difenconazole 0.05% spray)	
Banana	-	-	-	-
Sapota	-	Spray 0.2% wettable sulphur or 0.05% Hexaconazole for protection against powdery mildew	Protect the fruit against fruit spot (Difenconazole 0.05%spray)	-

2.3 Floods

Condition	**Suggested contingency measure**			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Transient water logging/ partial inundation[1]	NA			
Continuous submergence for more than 2 days	NA			
Sea water intrusion	NA			

2.4 Extreme events: Heat wave / Cold wave/Frost/ Hailstorm /Cyclone

Extreme event type	Suggested contingency measures			
	Seedling / nursery stage	**Vegetative stage**	**Reproductive stage**	**At harvest**
Heat Wave	Light & frequent irrigation to all crops	Light & frequent irrigation to all crops	Light & frequent irrigation to all crops	-
Cold wave	NA			
Frost	NA			
Hailstorm	NA			
Cyclone	NA			

2.5 Contingent strategies for Livestock, Poultry & Fisheries

2.5.1 Livestock

	Suggested contingency measures		
	Before the event	**During the event**	**After the event**
Drought	• Veterinary preparedness • Assessment of resources • Integration with the district system • Plan for rapid mobilization of resources specially Silage. • Dry fodder (fodder bank), complete feed blocks (CFBs)	-Assure and mobilize water supply	- Impact assessment
Feed and fodder availability	As the district is occasionally prone to drought the following measures to be taken to ameliorate the fodder deficiency	Harvest and use biomass of dried up crops (Bajra, Groundnut, Wheat, Mothbean, Green gram Maize, Sorghum etc.,) material as fodder	Training/educating farmers for feed & fodder storage. Maintenance / repair of silo

	Avoid burning of wheat straw Establishment of fodder bank at village level with available dry fodder (wheat straw and stover of bajra/sorghum) Increase area under perennial fodder cultivation with high yielding Hybrid Napier varieties. Conservation of maize/bajra/sorghum green fodder as silage Sowing of cereals (Sorghum/Bajra) and leguminous crops (Lucerne, Berseem, Horse gram, Cowpea) during early monsoon under dry land system for fodder production Encourage fodder production with Maize, Jowar, Bajra , Cowpea, Barseem, Lucerne etc., Processing & storage of feed/fodder and roughages in the form of complete feed/blocks.	Utilizing fodder from fodder bank reserves. Utilizing stored silage/hay. Transporting complete feed/fodder and dry roughages to the affected areas. Concentrate ingredients such as Grains, brans, chunnies & oilseed cakes, low grade grains etc. unfit for human consumption should be procured from Govt. Godowns for feeding as supplement for high productive animals during drought Continuous supplementation of mineral mixture to prevent infertility. Encourage mixing available kitchen waste with dry fodder while feeding to the milch animals	pits and feed/fodder stores. Encourage progressive farmers to grow multi cut fodder crops of sorghum/bajra/maize(UP chari, MP chari, HC-136, HD-2, GAINT BAJRA, L-74, K-677, Ananad/African Tall etc., Supply of quality fodder seed (multi cut sorghum/bajra/maize varieties) and fodder slips of Napier, guinea grass well before monsoon Replenish the feed and fodder banks
Drinking water	Adopt various water conservation methods at village level to improve the ground water level for adequate water supply. Identification of water resources Desilting of ponds Rain water harvesting and create water bodies/watering points (when water is scarce use only as drinking water for animals) Construction of drinking water tanks in herding places/village junctions/relief camp locations Community drinking water trough can be arranged in shandies /community grazing areas	Adequate supply of drinking water. Restrict wallowing of animals in water bodies/resources Add alum in stagnated water bodies	Watershed management practices shall be promoted to conserve the rainwater. Bleach (0.1%) drinking water / water sources Provide clean drinking water
Health and disease	Procure and stock emergency medicines and vaccines	Carryout deworming to all animals entering into relief	Keep close surveillance

management	for important endemic diseases of the area All the stock must be immunized for endemic diseases of the area Vaccination for HS & FMD Surveillance and disease monitoring network to be established at Joint Director (Animal Husbandry) office in the district Adequate refreshment training on draught management to be given to VAS, Jr.VAS, LI with regard to health & management measures Procure and stock multivitamins & area specific mineral mixture	camps Identification and quarantine of sick animals Constitution of Rapid Action Veterinary Force Performing ring vaccination (8 km radius) in case of any outbreak Restricting movement of livestock in case of any epidemic Drainage of water from and around animal sheds, pasture areas. Tick control measures be undertaken to prevent tick borne diseases in animals Rescue of sick and injured animals and their treatment Organize with community, daily lifting of dung from relief camps	on disease outbreak. Undertake the vaccination depending on need Keep the animal houses clean and spray disinfectants Farmers should be advised to breed their milch animals during July-September so that the peak milk production does not coincide with mid summer
Floods	**Not applicable**		
Cyclone	**Not applicable**		
Cold wave	**Not applicable**		
Heat wave	Arrangement for protection from **heat wave** i) Plantation around the shed ii) H_2O sprinklers / foggers in the shed **iii)** Application of white reflector paint on the roof **iv)** Thatched sheds should be provided as a shelter to animal to minimize heat stress	Allow the animals early in the morning or late in the evening for grazing during heat waves Feed green fodder/silage / concentrates during day time and roughages / hay during night time in case of heat waves Put on the foggers / sprinkerlers/fans during heat weaves in case of high yielders (Jersey/HF crosses) In severe cases, vitamin 'C' and electrolytes should be added in H_2O during heat waves.	Feed the animals as per routine schedule Allow the animals for grazing (normal timings)

Insurance	Encouraging insurance of livestock	Listing out the details of the dead animals	Submission for insurance claim and availing insurance benefit Purchase of new productive animals

2.5.2 Poultry

	Suggested contingency measures			**Convergence/ linkages with ongoing programs, if any**
	Before the event	**During the event**	**After the event**	
Drought				
Shortage of feed ingredients	Buffer stock of readymade feed	Ensure sufficient water supply	Resumption of routine management	
Drinking water				
Health and disease management	Routine vaccination and medication should be followed	Attention should be paid towards general management	-----do----------	
Floods	Poultry requires excellence in general management in respect of litter management and bio- security			
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Cyclone	In case of uncontrollable condition it is advisable to sell of the flock at the earliest	In case of uncontrollable condition it is advisable to sell of the flock at the earliest	Resumption of routine management	
Shortage of feed ingredients				
Drinking water				
Health and disease management				
Heat wave and cold wave				
Shelter/environment management		Measures to maintain at or near physiological optimum temperature		
Health and disease management		Measures to maintain at or near physiological optimum temperature		
		Nutritional manipulation like use of fats/edible oil in the ration, extra supplementation of		

		methionine, biotin, choline chloride and vitamin C etc.		

2.5.3 Fisheries/ Aquaculture

	Suggested contingency measures		
	Before the event[a]	**During the event**	**After the event**
1) Drought			
A. Capture			
Marine	Nil	Nil	
Inland	• Insure water storage & supply well in advance • Harvesting & marketing	• Watering of the ponds • -Harvesting & marketing	• Restoking of the ponds • Fertilization & manuring of ponds
(i) Shallow water depth due to insufficient rains/inflow	• First to ensure the water supply to maintain minimum level of water for fishes in that particular period. If not possible then harvesting & marketing	• To maintain water level is the only option otherwise harvesting & marketing	• Regular operations for the remaining stock and also restoring of newone
(ii) Changes in water quality	• Oxygen depletion may lead to death of fishes • -Ensure water supply or harvest the stock	- Harvesting & marketing • Emptying of pond	• Manuring, fertilization & rewatering • - Establishment of new stock
(iii) Any other			
B. Aquaculture			
(i) Shallow water in ponds due to insufficient rains/inflow	• Water is only the major component or necessity for such operations • Ensure water supply or otherwise stoppage of the operation / culling temporary • Water managemental practices		
(ii) Impact of salt load build up in ponds / change in water quality	• Attempts to be made to minimize oxygen depletion from water and also for oxygenation of water	• -Oxygenation of water • -Stirring of water with pumps	• -Re-establishment of normal managemental conditions

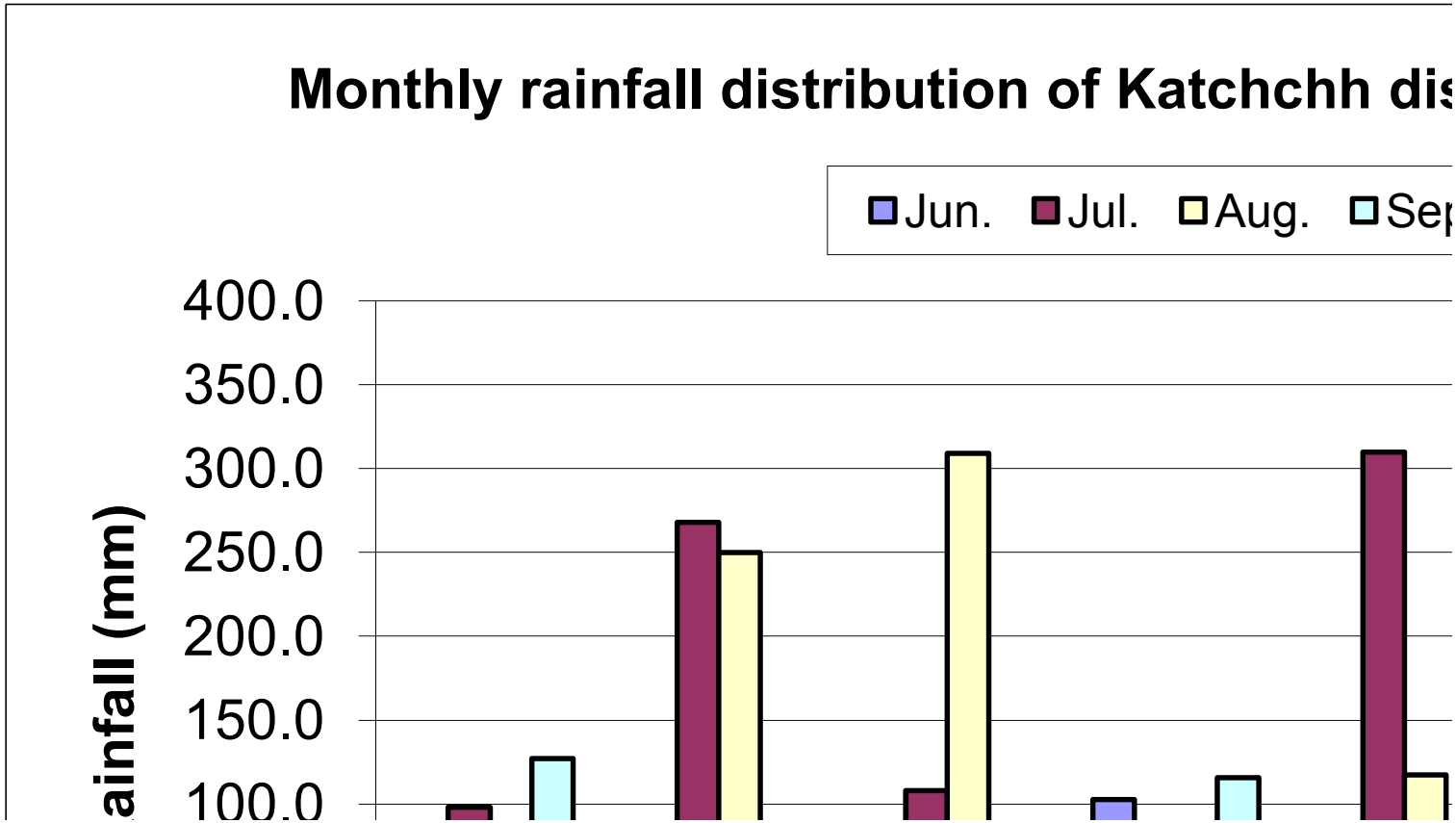
(iii) Any other	-Training and Awareness		
2) Floods			
A. Capture			
Marine	**Warning to the fisherman's, prohibition of fishing**		
Inland	• Fishing should be prohibited because of breeding season		
(i) Average compensation paid due to loss of human life			
(ii) No. of boats / nets/damaged	• Insurance • Arrangement of boats, nets etc in surplus		
(iii) No. of houses damaged	• Co-ordination with the district administration & assurance to fisherman	• Rescue & Help • Programme in collaboration with district system	• Rehabilitation of fisherman for all their necessities
(iv) Loss of stock	• Training & Awareness	• -Compensation	• -Compensation
(v) Changes in water quality	• Preparation for checking the inflow of outside runoff water in to the pond runoff water into the ponds	• Arrangement of checking overflow of ponds • Overflow of ponds • Net installations to capture the fishes going out due to overflow	• Proper oxygenation • Maintenance of water pH
(vi) Health and diseases	-	- -water treatment to minimize ectoparasite infestation	-
B. Aquaculture			
(i) Inundation with flood water			
(ii) Water contamination and changes in water quality			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, huts etc)			

(vi) Any other			
3. Cyclone / Tsunami			
A. Capture	Warning to the fisherman, prohibition of fishing		
Marine	Warning to the fisherman, prohibition of fishing		
(i) Average compensation paid due to loss of fishermen lives			
(ii) Avg. no. of boats / nets/damaged			
(iii) Avg. no. of houses damaged			
Inland			
B. Aquaculture			
(i) Overflow / flooding of ponds			
(ii) Changes in water quality (fresh water / brackish water ratio)			
(iii) Health and diseases			
(iv) Loss of stock and inputs (feed, chemicals etc)			
(v) Infrastructure damage (pumps, aerators, shelters/huts etc)			
(vi) Any other			
4. Heat wave and cold wave			
A. Capture			
Marine			
Inland			
B. Aquaculture			
(i) Changes in pond environment (water quality)			
(ii) Health and Disease management			
(iii) Any other			

Annexure-I

LOCATION MAP OF KACHCHH (GUJARAT)

Annexure-II


Monthly rainfall distribution of Katchchh dis
Jun.
Jul.
Aug.
Sep
400.0
350.0
300.0
250.0
200.0
150.0
100.0
ainfall (mm)